

REMARKS/ARGUMENTS

Entry of the present Amendment and reconsideration of all claims remaining of record as presently amended is respectfully requested. Claims 4-13 are currently pending.

Claims 6 and 11 are amended above so as to give greater emphasis to some of the novel and patentable features set forth in the specification.

Applicants respectfully request consideration of at least the following remarks which point out language in Applicants' claims believed to patentably distinguish over the prior art of record:

Applicants' apparatus and method claims distinguish over the prior art of record and set forth novel and patentable features and steps relating to the use and production of an investment cast hollow article having internal cast features or structures whose spatial positions may be precisely ascertained (for example, for the purpose of precision machining) by a novel spatial referencing system comprising one or more "datum pads" that are formed solely and exclusively by a free-floating core piece (as opposed to the shell mold) used in the investment casting process.

Applicants' independent claim 4 patentably distinguishes over the prior art of record at least in the reciting of "a free floating core...that produces a print-out region forming at least a portion of said internal cavity... wherein one or more datum pads are produced on said print-out region during casting and *said datum pads serving as a relative position reference system for spatially locating other resultant cast features produced within said internal cavity* by said free-floating core...", for at least the following reasons:

Neither Coulson nor Correia et al., considered either together or alone, teach or suggest a system of one or more "datum pads" that are *produced by the free-floating core piece* and which

serve as a relative position reference system for spatially locating other resultant cast features produced within said internal cavity. Applicants respectfully contend that there is no teaching, suggestion or motivation provided by Coulson that an identification tag formed on a cast article should or could be used as a “datum pad” as claimed by Applicants – i.e., in the sense of an embedded physical reference point used specifically for accurately ascertaining the spatial positions of *internal* features or structures of a hollow cast article that were formed by a free-floating core piece. To wit, the identification (ID) tag 30 of Coulson is provided on an *exterior* root surface 10a of the wax fugitive pattern 10. The ID tag 30 image is thereafter transferred to the wall W of shell mold 110, and then to an *exterior* surface of the metallic article cast in that shell mold. (See ‘197 patent at col. 3, lines 29-40; col. 6, lines 63-68 and col. 7, lines 10-12.) Although the relative position of ID tag 30 with respect to other *exterior* surface features of the hollow cast article may remain fixed despite movements or shifts in position of the free-floating internal core piece from one casting to the next, the position of ID tag 30 (i.e., its relative location and distance) with respect to features or structures formed on the *interior* of the hollow cast article by the free-floating core piece can and most likely will vary from one casting production to the next since the internal core piece is free-floating and may move or shift from one casting session to the next due to differences in thermal expansion or vibrations or other unforeseeable and uncontrollable process factors. This non-registration phenomenon between interior cast features and exterior surface cast features occurs because the interior cast features will shift in position with respect to the exterior cast features whenever the core piece moves or shifts with respect to the shell mold piece.

Any datum pad, or even an “ID” tag for that matter, that is produced by the *shell mold* as taught in Coulson, is formed on the *outside* surface of the cast object and therefore, for the very

reasons stated above, can not accurately or consistently serve as a reference to the position of internal cast features that are produced by a core piece that may move or shift position within the shell mold from one casting production to the next. Accordingly, the ID tag 30 of Coulson can not feasibly be used as a “datum pad” as claimed by Applicants, i.e., as a reference for the spatial location of interior features formed by the free-floating internal core piece, because if that core piece moves or shifts relative to the shell mold from one casting production to the next then the relative distances between an ID tag formed on the exterior cast surface of the article by the shell mold and the features or structures formed in the interior of the article by the core piece will be different from one casting production to the next.

In contrast and distinction to the prior art of record, if an integral physical reference point (i.e., a “datum pad”) is provided on the free-floating internal core piece, the relative position of that integral physical reference point with respect to other interior features formed by the same core piece will, obviously, always remain fixed from one casting production to the next irregardless of any movement or shifting in position of the core piece with respect to the shell mold. Consequently, Applicants contend that a physical “datum pad” reference system, as set forth in Applicants' claims, which is attached to the free-floating core piece and is produced relative to and along with other internal cast structures or features (i.e., one that is integral to and moves with the free-floating core piece) *patentably distinguishes from and is unobvious over the prior art of record.*

Applicants' independent claim 6 patentably distinguishes over the prior art of record at least in the reciting of “forming a free-floating core structure having a plurality of integral positive or negative datum regions for producing datum pads on an investment cast article...” and “performing machining operations on internal core-produced features of the cast article,

wherein the datum pads are used as a spatial reference system for precisely locating said internal core-produced features.” None of the references of record, considered either alone or together, teach or suggest a free-floating core structure having a plurality of integral datum regions or the performing of machining operations on internal core-produced features of the cast article using the datum pads as a spatial reference system, as set forth in Applicants’ independent claim 6.

Applicants’ independent claim 10 patentably distinguishes over the prior art of record at least in reciting the “forming a free-floating core structure for use in casting said airfoil or part, said core structure having a plurality of integral datum regions for producing datum pads on a cast part, wherein the datum pads are used as a geometric spatial reference system for precisely locating said internal core-produced features”. None of the references of record, considered either alone or together, teach or suggest a free-floating core structure having a plurality of integral datum regions used as a geometric spatial reference system for precisely locating said internal core-produced features, as set forth in Applicants’ independent claim 10.

Applicants’ independent claim 11 patentably distinguishes over the prior art of record at least in the reciting of “providing a free-floating core having an integral core-based reference datum scheme comprising one or more datum pad producing portions that result in producing one or more datum pads on a core-generated print-out or flashing portion of a cast article, wherein said core-based reference datum scheme is exclusive of any reference datum scheme based upon non-core-generated exterior features of said cast article”. None of the references of record, considered either alone or together, teach or suggest a free-floating core structure having an integral core-based reference datum scheme that is *exclusive of any reference datum scheme based upon non-core-generated exterior features of said cast article*, as set forth in Applicants’ independent claim 11.

In addition to the reasons set forth above, the rejection of claims 4-13 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Correia et al. (U.S. Patent 5,662,160) in view of Coulson (U.S. Patent 6,582,197) is respectfully traversed for at least the following further reasons:

The 4/5/2006 Office Action improperly relies on hindsight reconstruction of the claimed invention based on the teachings of the instant application in reaching its obviousness determination. "To imbue one of ordinary skill in the art with knowledge of the invention, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." See W.L. Gore & Assoc. v. Garlock, Inc., 721 F.2d 1540, 1543, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Only in view of the teachings of the instant application could the rejections possibly be maintained.

When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. See In re Geiger, 815 F. 2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). No references have been cited that provide a factual basis for the conclusion of what is alleged in the Office Action as being obvious, i.e., no teaching has been provided that suggests the obviousness of modifying Correia et al. to include an identification tag as taught by Coulson, much less a "datum pad" as claimed by Applicants, on a rib portion 126B or any other portion of core piece 128. Thus, the 4/5/2006 Office Action sets forth a conclusion of obviousness, not a reason supporting the alleged obviousness of the present invention. It is axiomatic that the PTO has a burden under §103(a) to establish a prima facie case of obviousness. See In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984).

In view of the Applicants' foregoing remarks, it is believed that the application is in condition for allowance. Favorable consideration and allowance of this application are respectfully solicited. If any small matter remains outstanding, the Examiner is encouraged to telephone Applicants' representative at the telephone number listed below.

Respectfully submitted,

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